Winter 1993

Winter 1993

NSU Oceanographic Center

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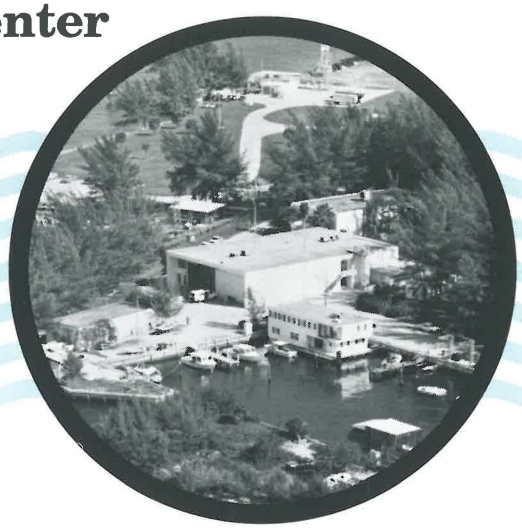
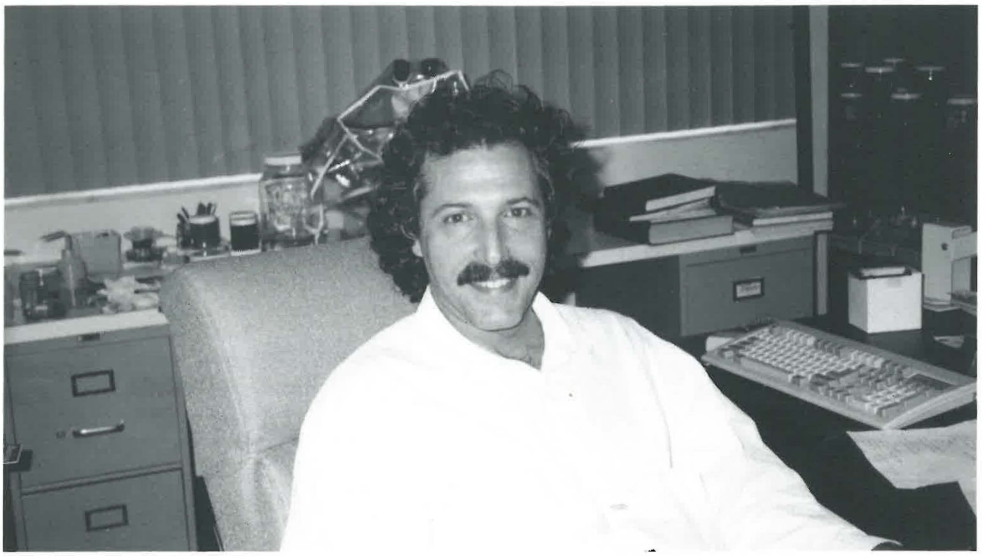
Currents



Winter 1993 • Volume VII, Number 1

Dr. Charles Messing's Laboratory a Busy Place



Dr. Charles Messing, busy project investigator.

Dr. Charles Messing oversees three major research projects in his new laboratory in the Schure Building: macroinvertebrate monitoring for the Hollywood/Hallandale beach renourishment project, the Port Everglades Southport Turning Notch project, and a deep-water crinoid study.

For both the beach renourishment and the Port Everglades projects, sediment samples are taken at local sites, fixed in formaldehyde, and then sieved in the laboratory. The sediment and organisms retained on ½-mm-mesh sieves are transferred to alcohol, after which each sample is studied under the microscope a small portion at a time. A battery of students is on hand to perform the nitty-gritty lab work: sorting critters from the sediment. The workers include **Pat Bellew, Chuck Featherstone, Eric Hull, Jim Jütte, Sarah Kowalski, Barbara Maloney, Bill Margolis, Gayle Stone,** and **Christine Urnezis.** Every specimen found is separated into one of four major groups: worms, crustaceans, molluscs, or other. The specimens are then further separated according to recognizable species, vialed, and either identified in the lab or sent off to other experts for taxonomic identification.

The organisms under study comprise primarily a variety of worms, such as ribbon worms, segmented worms, and peanut worms, as well as small crustaceans, molluscs, and other invertebrates. Messing reports that there are over 200 species of segmented worms to be found locally, and of those, about 15 percent are new to science.

The Port Everglades study is a three-year project, and monitoring takes place during January and August of each year. "I hope to be able to document whether there are significant changes in this component of the marine community due to human disturbances, namely dredging," Messing said. "I took over the project from someone else, so I don't know exactly what changes have taken place since before the dredging occurred. There are still large numbers of organisms there, so it is clear that habitats haven't been permanently decimated by dredging." He further concluded that "it is important to develop this baseline data, should there be any major oil spills or other catastrophes in the Port."

In the Hollywood/Hallandale beach renourishment project, which is headed by **Dr. Richard Dodge** and assisted by **Dr. Walter Goldberg** (of Florida International University), "it is clear that dredging and filling *have* modified the kinds of organisms present," Messing said. For this assessment, monitoring took place one year before dredging and immediately after dredging and will continue one, two, and four years after the event. Messing noted that some similar changes were seen after the John U. Lloyd Beach renourishment project in Dania a few years back.

Messing's group also is taking a census of crabs in the mangrove forests of Port Everglades to see whether they have changed in response to dredging

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Dr. Charles Messing's Laboratory a Busy Place

(Continued from page 1)

or mangrove mitigation activities. And not to be ignored are the intertidal organisms, such as barnacles and snails.

Last August an uninvited guest, namely Hurricane Andrew, clearly had a tremendous effect on the offshore sand-dwelling invertebrate community. Both number and diversity were reduced. Messing believes that if the reduction had been caused by dredging, "the effects would have been seen immediately. Preliminary data suggest the reduction has occurred at both the treatment and the control stations, indicating widespread changes to sand-bottom communities."

M.S. students Pat Bellew and Chuck Featherstone and undergraduate **Dana Rankin** are engrossed in another ongoing study, this one having to do with deep-water crinoids. The project, sponsored by the National Science Foundation, will be described in more detail in a future issue of *Currents*.

On the horizon is a museum reference collection of Broward County marine life. Messing has begun to accumulate likely specimens for the collection, which will be made available to researchers from other institutions and environmental agencies.

Chuck Featherstone and Pat Bellew at their microscopes.

Jim Jütte and Bill Margolis in the lab.

People on the Move

Dr. Pat Blackwelder attended the NECOP (Nutrient Enhanced Coastal Ocean Productivity) Data Workshop, January 12-14, at the Gulf Park Campus of the University of Southern Mississippi in Long Beach, MS. Project summaries by the investigators were among the agenda items at the workshop. The program is funded by NOAA.

Dr. Curtis Burney and M.S. students **Barbara Maloney, Bill Margolis**, and **Cathy Mattison** traveled to Jekyll Island, Georgia, February 23-26, to attend the Twelfth International Sea Turtle Symposium. Dr. Burney presented a talk entitled "Nesting Periodicity in the Loggerhead Sea Turtle," and Cathy Mattison spoke on "Trends in the Spatial Distribution of Sea Turtle Activity on an Urban Beach."

Dr. Julian McCreary will travel to the University of Hawaii in Honolulu to attend a meeting of TOGA (Tropical Ocean Global Atmosphere) participants, to be held March 1-5.

Dr. Gary Kleppel will serve as co-convenor of a workshop on "Physical Control of Biological Production in the Irish Sea," which will be held March 30 - April 1 at the University of Bangor in Bangor, Wales. The other co-convenor is **Dr. Keith Brander**, of the Ministry of Agriculture, Fisheries and Food in Loestoft, England. The workshop will be attended by representatives from the U.S., England, Ireland, Northern Ireland, and Wales. M.S. student **Carol Burkart** will present a talk entitled "Microzooplankton Distributions and Their Relationship to the Diets and Productivity of Mesozooplankton," which is part of her M.S. thesis and is co-authored by Dr. Kleppel. Other U.S. participants include **Dr. M. Elizabeth Clarke**, of the University of Miami, **Dr. Van Holliday**, of Tracor Inc. in San Diego, **Dr. William Peterson**, of NOAA/GLOBEC in Rockville, Maryland, and **Dr. Richard Pieper**, of the University of Southern California. Travel support for U.S. participants is provided by the National Science Foundation's Office of International Programs.

Cruise News

Dr. Charles Messing and students **Pat Bellew, Chuck Featherstone**, and **Dana Rankin** participated in a research cruise to the Bahamas aboard the R/V *Seward Johnson*, of the Harbor Branch Oceanographic Institute, February 7-10. Using the Johnson Sea Link submersible, they studied the ecology of living sea lilies in order to better understand fossil sea lilies.

As part of the continuing Coastal Production Project, supported by the Florida Department of Natural Resources (DNR), another cruise to the Gulf of Mexico will take place in early March. Onboard the R/V *Sun Coaster*, belonging to the Florida Institute of Oceanography, will be **Dr. Gary Kleppel**, students **Kevin Carter** and **Gayle Stone**, and Project Director **Dr. Carmello Tomas**, of DNR.

Center Seminars

On December 4, Center faculty member **Dr. Gary Kleppel** presented a seminar in the Richardson Library entitled "On the Diets of Copepods: Response to Environmental Variability, Relation to Productivity."

Dr. Charles Messing, also a member of the Center faculty, gave a talk on December 11 entitled "Crinoid (Sea Lilies and Feather Stars) Research at Nova: Ecology, Biogeography, Taphonomy, and Systematics."

Not to be outdone, on January 15 Center faculty member **Dr. Richard Dodge** presented a seminar entitled "Growth Banding in Corals."

On January 29, **Dr. John R. Clark**, a visiting scientist from the University of Miami, gave a talk entitled "Scientific Input into Coastal Resources Management and Environmental Conservation in Developing Countries."

Dr. Julian McCreary, Dean and Director of the Center, presented a seminar to staff and students on February 5 entitled "A Numerical Investigation of Dynamics, Thermodynamics and Mixed-layer Processes in the Indian Ocean."

Sea Turtle Report: Nesting Up, Eggs Down

According to a report on the Sea Turtle Conservation Project for Broward County in 1992, submitted to the county's Office of Natural Resource Protection in Fort Lauderdale, nesting statistics are good again this year. The bad news is that hatching success is down. **Dr. Curtis Burney**, Principal Investigator, co-authored the report with **Cathy Mattison,** Project Manager.

In discussing the 2,221 loggerhead turtle nests counted in 1992, Burney stated, "It looks like loggerheads might be coming back. Greens also appeared in record numbers this year: 132 nests." The greens broke a record in 1990, but there were only a few nests last year. Now they are back. Even leatherbacks made a comeback, with 7 nests counted in 1992. Figure 1 gives the historical pattern of total sea turtle nesting in Broward County since full surveys began in 1981. Figure 2 shows nesting patterns for loggerheads and green and leatherback sea turtles since 1981.

As for the hatchlings, those that made it to the sea before Hurricane Andrew's visit on August 24 were fortunate. Burney said that 546 loggerhead nests and 83 green turtle nests were destroyed by the storm in Broward County. "Some turtles might have hatched," he added, "but there is no way to tell. At Hillsboro Beach, about 50 miles north of the storm's center, all but about 100 of the nests hatched after the hurricane." Nest markers were blown away, so it was hard to be precise. Figure 3 shows a severe reduction in data points at about Julian day 185, due entirely to the arrival of Andrew.

According to the report, "In spite of the devastation caused by the hurricane, the total number of released *C. caretta* [loggerhead] hatchlings was down only 16 percent from 1991." One explanation for this somewhat encouraging figure is that the hurricane occurred late in the nesting season, so a great number of nests had already hatched. Let us hope that we won't have to make these allowances again any time soon.

Dr. Curtis Burney provides nesting data.

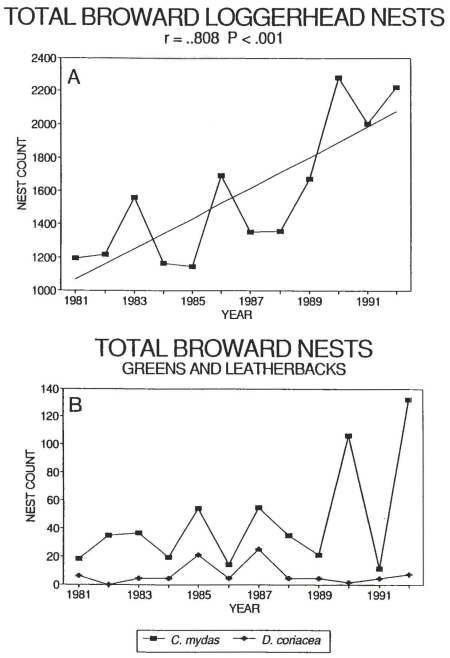


Figure 2. Nesting patterns since 1981.

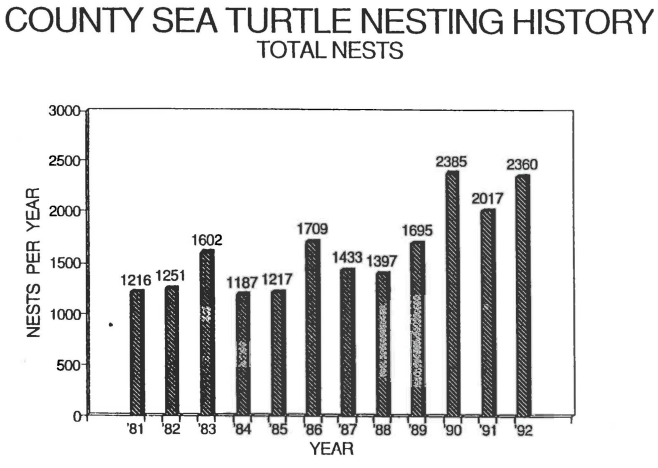


Figure 1. Historical nesting pattern since 1981.

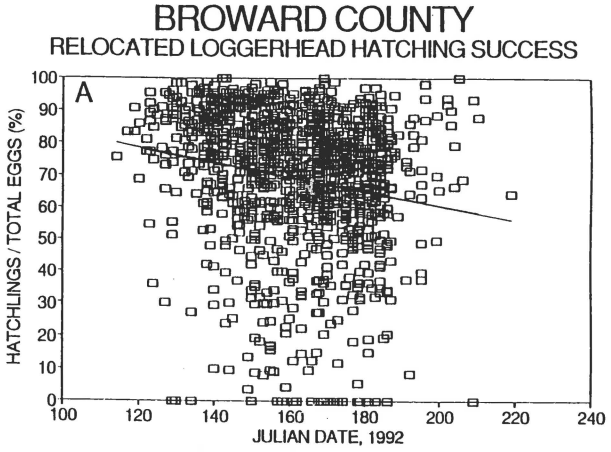
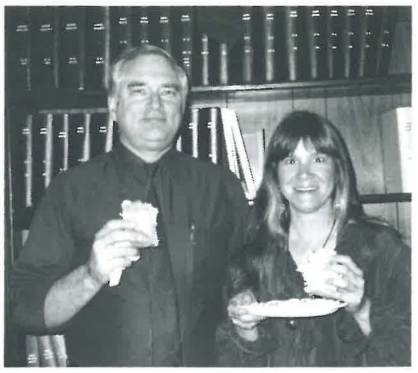


Figure 3. Hatching success of relocated nests.

Holiday Party Shines

On December 18, staff and students, dignitaries, and other guests assembled in the Richardson Library for the annual holiday party. It was a very festive occasion that brought together many old and new friends. The food, it was noted, disappeared at about the same rate as in prior years.

Bill Margolis, Dr. Andrew Cole, Gayle Stone, and Vicki Cruse pause at the party.



Dale Vicha enjoys refreshments with Cathy Mattison.

Kathy Maxson with visiting grandson, Scotty.

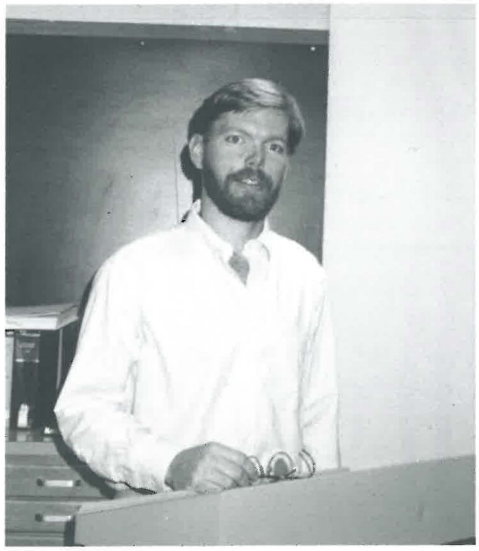
Center graduate Dr. Robert Kennedy, Jody Snyder, former staff member Linda Smith (of RSMAS), and Dr. Russell Snyder.

Stephanie Morris and Nova's Joe Lakovitch.

Kevin Carter Presents Thesis Project to Center

On January 8, M.S. student **Kevin Carter** presented a seminar to faculty, staff, and students outlining his proposed thesis work in marine biology. The title of his thesis is "Nutrition and Egg Production of Calanoid Copepods Associated with the Protein, Lipid and Carbohydrate Concentration in the Food Environment."

Carter's research work began last summer during two research cruises in the Gulf of Mexico, under the auspices of the Florida Department of Natural Resources. During the cruises he collected copepods and conducted an egg production experiment onboard ship. He placed the copepods in incubators, allowing surface sea water to flow through them so that the temperature in the incubators was the same as that in the natural environment. After 24 hours, the samples were fixed in solution and brought back to the Center laboratory. There Carter counted the tiny copepod eggs under the microscope, to determine the number of eggs laid by a copepod per day. Concurrently, water samples had been collected on filters at sea and frozen onboard. They then underwent biochemical analysis in the laboratory to characterize the copepods' food environment.



Kevin Carter, at the podium.

The next segment of the research project will find Carter back on cruises in the Gulf of Mexico, as well as on local forays into the Florida Current and Port Everglades, to collect samples. He will perform the same analyses as before, to see whether egg production correlates with the three major nutrients in absolute and relative abundance in the different food environments.

Carter is looking at three major classes of nutrients because they are all important to egg production. By studying a variety of copepod species from different food environments, he hopes to be able to make a general statement about copepod nutrition and egg production. "Very little is known about this relationship," said Carter. "We know that food environment and temperature are important factors—we are just not sure about specific nutrients."

Carter acknowledged his major professor, **Dr. Gary Kleppel**, as having been a major part of his project, both in providing the concept of the study and in the conduct of the actual research

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UNDERCURRENTS
INSTITUTE OF MARINE AND COASTAL STUDIES

SPRING TERM SCHEDULE

M.S. degree specialties are **Marine Biology** and **Coastal Zone Management.** Each course carries three credit hours or may be audited. Tuition is $275 per credit hour (50 percent less for audit). Classes meet once a week from 6:30 to 9:30 P.M. at the Oceanographic Center. The spring term extends from April 5 to June 25. For further information, call (305) 920-1909.

Marine Geology (OCOR-5604): A CORE course. Describes the origin, form, and resources of the ocean basins and continental margins. Includes discussion of sea floor spreading, trenches and island arcs, mountain building, coral reefs and atolls, sedimentation, ocean mining, coastal morphology, and the impact of wave action and human activity on beaches and coasts, continental shelves, and submarine canyons. Instructor: **Dr. Pat Blackwelder** (Center faculty). Starts Monday, April 5.

Marine Mammals (OCMB-6330): Limited enrollment. Deals with a variety of topics, including psysiological profile, anatomical structure, energetics, feeding habits, population dynamics, and interactions with man and other species. Comparisons will be made among the 4 major groups of marine mammals. Instructor: **Dr. Keith Ronald** (Center adjunct; University of Guelph). Starts Tuesday, April 6.

Dynamic Biological Oceanography (OCMB-6195): Explores relationships between the physical environment and biological productivity in the ocean. Emphasis is on understanding how water movements influence marine life by building conceptual bridges between fundamental concepts in physical oceanography and marine ecology. Guest lectures and round-table discussions will be incorporated. Instructor: **Dr. Gary Kleppel** (Center faculty). Starts Wednesday, April 7.

Oil Pollution Effects (OC / CZ-6340): Focuses on the impact of petroleum hydrocarbons on natural and human environments. Provides a background in petroleum chemistry, natural and human resources at risk, effects and fate of spilled hydrocarbons, relevant regulations, and spill contingency planning. Students will participate in a spill drill, study recent spill sites, review area contingency plans, and use computer-generated maps for oil spill response. Some Saturday field trips required. Instructor: **Dr. Bart Baca** (Center adjunct faculty; Coastal Science Associates, Inc.). Starts Thursday, April 15.

Summer Term Schedule

The summer term extends from July 5 to September 17. Course descriptions will be printed in the next issue of *Currents*.

Marine Chemistry (OCOR-5605): A CORE course. Instructor: **Dr. Curtis Burney** (Center faculty).

Law and the Coastal Zone (CZMT-0603): Instructor: **Stephen King, J.D.** (Center adjunct).

Aquaculture (OCMB-6200): Instructor: **Dr. Bart Baca** (Center adjunct).

Marine Zooplankton (OCMB-6065): Instructor: **Dr. Gary Kleppel** (Center faculty).

Students in the News

On January 25, Oceanographic Center Student Association past-President **Kevin Carter** announced the results of their student election. New officers for 1993 are **Eric Hull**, President, **Chuck Featherstone**, Vice-President, **Melissa Dore**, Secretary, and **Monika Grossman**, Treasurer. Carter thanked the officers who served during 1992, as well as others at the Center who facilitated Association activities, especially Coastal Studies Administrative Assistant **Bonnie Pastor** and Maintenance Manager **Diego Rodriguez**.

M.S. student **David Stout** has reported on his position with Broward County's Office of Natural Resource Protection (ONRP), Marine Resources Section. He is involved in several coastal zone management projects, and he remarked, "I use all of the course work presented in the Nova CZM program on a daily basis, especially material discussed in the Introduction to CZM, Marine Ecology, and Coastal Engineering courses." His duties include assisting in beach erosion studies along the county's 24-mile coastline. He is also involved in the county's Reef Mooring Buoy Program and the Artificial Reef Program.

As part of current field studies, Stout is gathering data that will be used to develop a comprehensive inlet management plan for Port Everglades. On this project he works with CZM student **Inger Hansen**, who is working at Coastal Technology Inc., a Miami engineering consulting firm that is under contract to ONRP for Port studies.

Stout also reported on CZM student **Ali Al-Kiyumi**, who currently works for the Sultanate of Oman's Ministry of Environment as its Director of National Conservation Strategies. One of his many responsibilities is to manage the Oman Sea Turtle Conservation Program. He represents his country at conferences and seminars around the world, many of which are sponsored by the U.N. This year his travels will take him to the International Sea Turtle Symposium at Jekyll Island, Georgia (see "People on the Move"). Apparently

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Kevin Carter Presents Thesis Project to Center

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work. He is also grateful for the cruise experience and for ongoing conversations regarding the project. He thanks fellow M.S. student **Carol Burkart** for helping to keep the phytoplankton cultures alive. They were important to Carter while he was learning biochemical methods used in his research.

Carter plans to finish his research project by the end of this summer. Then he plans to continue his studies toward the Ph.D. degree under the tutelage of Dr. Kleppel. In that work, he will be looking at more specific nutrition issues, such as amino acids and fatty acids, to add to our knowledge about the nutritional environment as it relates to egg production.

Students in the News

(Continued from page 5)

Ali Al-Kiyumi with prize catch.

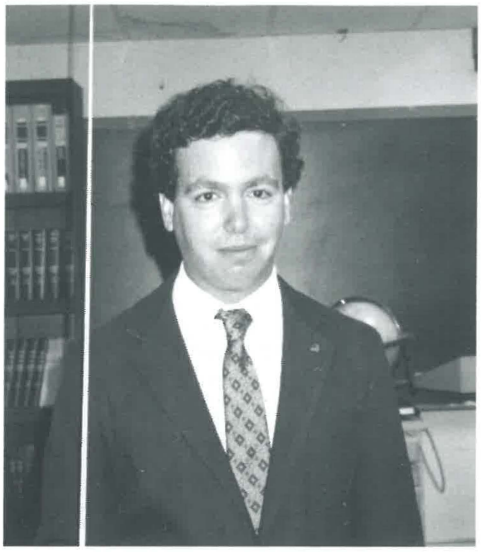
Al-Kiyumi is not saddled with all work and no play (see photo of Gulf of Oman wild life specimens above).

Undergraduate Currents

Florida Sea Grant again has recognized Florida college students with financial awards for scholarship.

Robin Sherman, an undergraduate student in Nova's Joint Marine Sciences Program, is one of six Florida students to receive this year's award, through the generosity of the Aylesworth Foundation for the Advancement of Marine Sciences.

Bill Margolis Defends Thesis



Bill Margolis makes a point during defense.

Bill Margolis successfully defended his M.S. thesis on January 14. The thesis was entitled "Nesting Periodicity of the Loggerhead Sea Turtle *Caretta caretta* in Broward County, Florida." His major professor was **Dr. Curtis Burney**, and his committee included **Dr. Richard Dodge** and **Mr. Wayne Witzell**, of the National Marine Fisheries Service in Miami.

Margolis has worked on Nova's sea turtle conservation project since 1989. Throughout four turtle "seasons," he has been part of the beach patrol, that group of hardy souls that assembles in the predawn hours from April through September to locate, identify, and assess the vulnerability of sea turtle nests on Broward County beaches. He helped dig up endangered nests and then relocate them in safe areas established along the beaches. The fun part was helping to release the hatchlings from protected areas in Fort Lauderdale, Pompano Beach, and Hollywood. He did not have to worry about the relocated nests in Hillsboro Beach, because they were not fenced in and thus the hatchlings were able to get to the water on their own.

In his project, Margolis's primary interest was maintaining daily nest and crawl counts in his search for patterns and trends in the data. He paid close attention to any apparent correlations between moon phase and certain tidal parameters, such as high tide times and tide range (rates of ebbing and flooding tides). He used linear regression and correlation matrices to compare the daily counts with the chosen parameters.

Margolis did find a trend toward more nesting activity on nights when high tide occurred at about 10:00 P.M., as well as during times of new and full moons. During the height of the nesting season, he also noted peaks in activity during times of quarter moons.

Margolis has concluded that there is a trend toward higher nesting activity during certain periods of time. This conclusion, he states, "could aid future conservation efforts, or tagging studies, if they are ever done."

As for his future plans, Margolis hopes to find a good position either in this area or in the Pacific Northwest. He wants to be active in the field of marine conservation, but preferably not in the research end of it.

Stephanie Morris presents her thesis work.

Vicki Cruse explains her mitigation project.

Morris Defends M.S. Thesis

On January 7, **Stephanie Morris** successfully defended her M.S. thesis, entitled "Effects of Dredging on Two Species of Stony Corals of Southeast Florida."

In 1991 the beaches of Hollywood and Hallandale, Florida, underwent what is known as their First Renourishment. Morris's task was to assist with assessment of the effects of renourishment on the corals just offshore. Her major professor was **Dr. Richard Dodge**, and her committee included **Dr. Walter Goldberg, Dr. Curtis Burney**, and **Mr. Louis Fisher**, of the Broward County Office of Natural Resource Protection.

According to Morris's abstract, approximately 1.1 million cubic yards of beach-compatible material was taken from two offshore borrow areas and placed on 5.3 miles of beach. Treatment stations were located offshore, adjacent to the borrow area, and nearshore, adjacent to the fill area. Control stations were located about 3 km north, off Lloyd Beach State Park.

Two coral species, *Solenastrea bournoni* and *Dichocoenia stokesii*, were monitored monthly on each reef. During her dives, Morris looked for signs of bleaching and polyp expansion, which are indicators of stress and surface clearing ability, respectively.

After dredging was completed, corals were collected for growth analysis. Using the Alizarin stain method, Morris found a significant decrease in the extension growth rate in *S. bournoni*, but not in *D. stokesii*, associated with increased sedimentation and turbidity. "A decrease in fossa length of *D. stokesii* suggested that sedimentation caused a change in columella shape," according to Morris. She concluded that "Bleaching occurred in many of the colonies but may have been caused by an unknown factor. Polyp expansion, a means of sediment rejection, did not correlate with increased sedimentation. This study suggests that the effects of sedimentation and turbidity on stony corals are species specific."

Morris has obtained a position with Robert H. Miller and Associates, a local engineering firm. Her primary job involves monitoring wetlands mitigation projects, mostly in the Everglades.

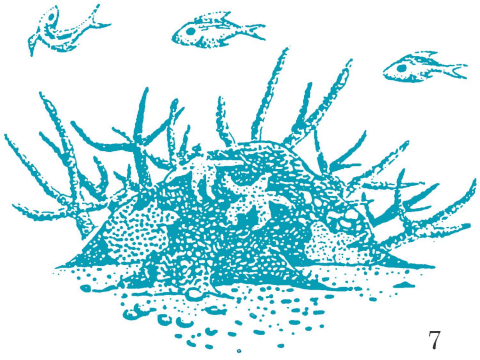
Cruse Successfully Defends Thesis

On December 3, M.S. student **Vicki Cruse** successfully defended her thesis, entitled "An Evaluation of the Effectiveness of Wetland Mitigation in Broward County, Florida, Permitted by the Florida Department of Environmental Regulation." Her major professor was **Dr. C. Andrew Cole**, and her other committee members were **Dr. Richard Dodge, Mr. Jim Goldasich**, of the Office of Natural Resource Protection, and **Mr. Larry O'Donnell**, of the Florida Department of Environmental Regulation (FDER).

To gather her research data, Cruse consulted FDER agency permit files. In this way she was able to analyze wetland impacts and the required mitigation for the years 1983-91. According to her thesis abstract, "Field evaluations were conducted to determine the actual area of wetland impacts and completion of required mitigation as permitted by FDER. Mitigation areas were evaluated based upon a set of criteria developed for this study. A total of 82 permits were reviewed, resulting in the evaluation of 30 completed mitigation areas."

Cruse found that freshwater wetlands containing both forests and marshes were permitted for the largest impact and saw the most project activities. Mangroves made up the largest area of required mitigation, while freshwater forested areas had more completed mitigation.

The results of the evaluations of mitigation areas showed that "permitted wetland impacts were incomplete at 24% of the sites, mitigation was not required in 5% of the permitted projects, mitigation was either incomplete or not attempted at 41% of the proposed mitigation areas, and permit requirements were met at 30% of the mitigation areas."



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Japanese Scientists Visit Center

On November 6, 34 scientists from Japan, along with 9 U.S. scientists, visited the Oceanographic Center as part of the U.S./Japan Cooperative Program in Natural Resources, sponsored by NOAA/National Ocean Service. For the Japanese, the purpose of the visit was to improve their knowledge of ways to protect the environment and utilize natural resources. The Center was just one stop among several during the group's 10-day tour of major marine facilities in the U.S. **Dr. Gary Kleppel** served as host for the Center and greeted the delegation. Nova president **Stephen Feldman** addressed the group, after which they toured the Center and moved on to the University of Miami.

Dr. Stephen Feldman addresses visiting scientists.

Editor: **Jan Witte**

Published quarterly by
Nova University
3301 College Avenue
Fort Lauderdale, Florida 33314